

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Facilitating the Deployment of Text-to-911 and)	PS Docket No. 11-153
Other Next Generation 911 Applications)	
)	
Framework for Next Generation 911)	PS Docket No. 10-255
Deployment)	
)	
)	

COMMENTS OF NEUSTAR, INC.

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EXECUTIVE SUMMARY

Neustar supports efforts by the Federal Communications Commission (“Commission”), the telecommunications industry and the public safety community to move to next-generation 911 (“NG911”). NG911, by taking advantage of Internet Protocol (“IP”) based services, promises to provide the public with more robust ways of communicating with emergency services personnel, including text, pictures and video.

Because NG911 will not be deployed ubiquitously, it may be beneficial to have an interim solution to enable text-to-911. Neustar has developed a possible interim solution that it demonstrated to Chairman Genachowski on September 16, 2011. Neustar’s solution involves converting a standard Short Messages Service (“SMS”) text into a TTY message for routing to the appropriate PSAP. If this solution proves out in testing with providers, Neustar believes that, because it uses existing technology and systems, it can be deployed relatively quickly with relatively little expenditure by providers or public safety agencies.

Neustar believes that long-term NG911 can bring many benefits to consumers. In particular, NG911 will fulfill consumer expectations that text-to-911 should work or already works. In addition, NG911 will provide significantly improved information for PSAPs and first responders and will also lead to improved reliability and resiliency of the NG911 system.

The NG911 standards developed by the National Emergency Number Association (“NENA”) based on the emergency calling standards of the Internet Engineering Task Force (“IETF”) have been reviewed extensively and are already being used in procurements. Version 2 of the NENA i3 standards will be completed in 2012. The Alliance for Telecommunications Industry Solutions (“ATIS”) and the 3rd Generation Partnership Project (“3GPP”) are also working on NG911 standards for IMS networks. As that important work progresses, Neustar

believes that NENA and the IETF will be willing to work with ATIS and 3GPP to ensure that the standards are compatible.

NG911 will require the deployment of Emergency Services IP Networks (“ESInets”) that can be shared by all public safety organizations in a community. Neustar believes that the states are in the best position to plan and deploy ESInets, and the NG911 infrastructure that rides on such networks. Neustar also believes that a national backbone infrastructure will be necessary to facilitate and optimize traffic, particularly in a large scale disaster.

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Neustar, Inc. (“Neustar”) submits these comments in response to the Notice of Proposed Rulemaking (“Notice”) that the Federal Communications Commission (“Commission”) adopted in the above captioned proceeding.¹ In the Notice, the Commission sought information about a number of issues regarding interim solutions for the provision of text messages to 911 as well as about the transition to next-generation 911 (“NG911”). In these comments, Neustar will provide its insights on these important public safety issues.

I. INTRODUCTION

Neustar supports the efforts of the Commission, the telecommunications industry and the public safety community to move to NG911. NG911, by taking advantage of Internet Protocol (“IP”) based service, promises to provide the public with more robust ways of communicating

¹ Facilitating the Deployment of Text-to-911 and Other Next Generation 911 Applications, PS Docket No. 11-153 and Framework for Next Generation 911 Deployment, PS Docket 10-255, *Notice of Proposed Rulemaking* (2011)(“Notice”).

with emergency services personnel, via including text, pictures and video. NG911, however, will take significant time to deploy and will require significant resources from both the telecommunications industry and the public safety agencies. In addition, NG911 will not be deployed everywhere simultaneously. Instead, it will most certainly arise in a patchwork fashion depending on the technology investment choices of industry and public safety. Unfortunately, such a piecemeal approach presents difficulty for users of NG911 services because it will be difficult for them to determine whether NG911 is available at their location. It is important, therefore, for that the Commission, industry and public safety look for interim solutions that will enable at least some advanced services ubiquitously before the full deployment of NG911.

Neustar will first discuss interim text-to-911 solutions, including a recent demonstration of such a capability that it made to Commission Chairman Julius Genachowski. Neustar will then address some of the issues regarding the deployment of NG911.

II. INTERIM TEXT-TO-911

The transition to NG911 is not going to be rapid, will not be geographically simultaneous and, within a geographic area, will occur at different rates for each carrier serving that area. Rather than waiting for full deployment of NG911 or, in the alternative, attempting to turn on NG911 as it becomes available by region and by carrier, it could be very beneficial to have an interim solution that can deliver the most sought after NG911 capability – text-to-911 – nationwide within a short time and with relatively little investment on the part of carriers and public safety agencies. Such a solution would allow for users to be able to begin texting to 911 regardless of where they are in the United States and regardless of the wireless carrier from which they receive service. Such a solution, by relieving the most urgent demands for NG911, will allow

telecommunications carriers and PSAPs to make NG911 upgrades in timeframes and locations that satisfy their infrastructure investment plans.

Several text-to-911 trials have been made public.² To date, those trials have been in limited geographic areas, most have involved just a single wireless provider, and none provided true location information to the PSAP. As the Commission noted, at least one carrier felt that one of the trials “resulted in confusion that ‘spread throughout the country’ regarding where text-to-911 is available.”³ It is not clear that any of the approaches taken can be deployed ubiquitously in a short amount of time.

A. Neustar Interim Solution

Neustar has developed an approach that allows text messages that include accurate routing of text messages to the correct PSAP and accurate location information sent to PSAPs. Neustar believes that its approach will require only minimal expenditures by telecommunications carriers⁴ or by PSAPs, although PSAPs may have to engage in some additional training for their personnel. Neustar’s approach involves the user sending a normal text message to 911. The text message is routed to a Neustar SMS gateway where a query to a network element retrieves the serving cell ID, which the gateway then uses in a manner identical to 911 wireless call routing to enable routing text to the correct PSAP. Neustar then converts the message into a text telephone (“TTY”) protocol and sends the message as a TTY audio call to the PSAP over the same system presently used by VoIP carriers. The PSAP receives an audio call from the Selective Router just as it would a normal TTY call, and receives the message over its standard TTY equipment. The PSAP call taker is able to have a two way message exchange with the texter. The PSAP is able to query the ALI system for location, which, if initiated early in the session, will return a cell

² *Id.* at ¶42.

³ *Id.*

⁴ Neustar believes the cost to carriers will be cents per month per subscriber.

based location but in most cases will return the actual caller location if tried later in the session, using the same mechanisms used to determine the caller's location for a voice call.⁵

Neustar demonstrated this capability for Chairman Genachowski and members of his staff on September 16, 2011.⁶ From Neustar's headquarters in Sterling, VA, Neustar personnel were able to send a text-to-911 message to the Loudoun County PSAP, which received it and was able to determine the location of the texter. Neustar personnel also texted to 911 from two locations in Washington, DC. Both texts were received by the PSAP serving the District of Columbia and, as with Loudoun County, the D.C. PSAP was able to obtain accurate location information. There was an issue of garbled text at one location, but Neustar believes that was a result of the call taker keeping the telephone off hook, rather than hanging up to participate in the TTY session. Neustar has since demonstrated its solution with another large PSAP without encountering any difficulties. Although these have just been demonstration projects, Neustar is willing to participate in trials with any providers wanting to participate.

Neustar believes that this approach, after appropriate testing, can be deployed relatively quickly across the United States to all networks, all PSAPs and all text capable handsets. Telecommunications carriers would only need to make small investments in providing cell ID query mechanisms where they are not already deployed for itinerate use, and PSAPs should be able to handle text-to-911 using their existing TTY equipment.⁷ There will be some additional

⁵ Wireless networks that use network based location determination may not be able to accurately locate texters because such mechanisms may depend on an actual call being in progress to get enough measurement data from the network. As noted in ¶56 of the Notice, this is an inherent problem for any system that uses network based location rather than handset based GPS. Fortunately, the number of non-GPS handsets is dwindling.

⁶ See *Letter to Marlene Dortch, Secretary, Federal Communications Commission, from Scott Blake Harris, Executive Vice President, Neustar, Inc., Re: Notice of Ex Parte – Framework for Next Generation 911 Deployment*, PS Docket 10-255, September 16, 2011.

⁷ Although it is recommended that all answering positions in a PSAP be equipped with TTY capability, and many PSAPs have such equipment, some PSAPs only have a small number of TTYs for a larger set of positions. Depending on actual call volume, additional TTYs, which cost several hundred dollars, may have to be purchased.

training necessary for PSAP staff so that they can handle the increase in TTY traffic. If it is deployed, text-to-911, at least in an interim form, will become a reality, which would enable the telecommunications industry and PSAPs to invest in NG911 technology at a more reasoned pace while giving consumers confidence that no matter where they are or what network they are on, text-to-911 will work.

Neustar recognizes that any SMS text-based system, particularly a hybrid system that also includes a TTY component, has shortcomings. Among those with concerns are the National Emergency Number Association (“NENA”) and the Association of Public Safety Officials (“APCO”) both expressed quality of service concerns about the use of SMS for emergency communications.⁸ Neustar is not aware of any other approach that can be universally deployed as quickly or inexpensively as its solution, particularly not one that connects a consumer directly to a PSAP and provides accurate location information. As noted by the Commission in the Notice, however, a number of commenters on the Notice of Inquiry⁹ mentioned that there is a public expectation that SMS-to-911 either is or will be available, and that SMS is a viable interim solution.¹⁰ Although not perfect, Neustar believes that its solution can serve the nation well in the interim until NG911 is deployed.

B. Software Based Interim Solutions Will Not Work

The Commission sought comment on “the feasibility of using general texting or 911 specific applications to support a transitional non-voice NG911 system that would allow consumers to send text and other non-voice media to PSAPs.”¹¹ Neustar does not believe that

⁸ See, NENA NOI Comments at 14 and APCO NOI Comments at 12.

⁹ Framework for Next Generation 911 Deployment, PS Docket No. 10-255, *Notice of Inquiry*, 25 FCC Rcd 17869 (2010) (“*NOI*”).

¹⁰ *Notice* at ¶51. See, also, TCS NOI Comments at 91, TSAG NOI Comments at 1 and Intrado NOI Comments at 13.

¹¹ *Notice* at ¶57.

such software based systems are appropriate, although they could be part of a solution. The primary problem in relying on software applications as described is that they would only be used in emergency calls. It is difficult for users to remember to invoke a special app, and even more difficult to use an unfamiliar user interface when they need help.

Of course, having the application is only one part of the problem – getting the text into the PSAP is the other part. Absent an expensive upgrade to PSAP equipment (*e.g.*, the Durham, NC upgrade reportedly cost \$104,000 for the Intrado/Verizon trial¹²) there is not a way to get text into the PSAP other than via TTY as Neustar proposes.

It is conceivable to have code in a handset that is part of some existing text communications application (*e.g.*, one of several instant messaging applications), which could be augmented to be used to send text to the Neustar gateway. Such applications may be able to get around the limitations of SMS. It is also conceivable to enhance the handset SMS application to use some different mechanism to communicate when sending text to 9-1-1. Such changes would best be covered in future standards work, however, and would need handset upgrades to be deployed.

III. FACILITATING THE LONG-TERM DEPLOYMENT OF NG911

A. Benefits of Long-Term NG911

Neustar believes that there are many benefits to providing consumers with the ability to communicate with the 911 system through a variety of media. The Commission asked for Comment on several of the perceived benefits; Neustar will address those here:

¹²“Durham 911 Center launches texting trial,” City of Durham Press Release, August 4, 2011, available at: <http://abclocal.go.com/wtvd/story?section=news/local&id=8286397>. (“The next-generation 911 technology upgrade, approved by City Council in September 2009, cost \$103,500 and was funded by the 911 Surcharge Revenue Fund”.)

1. Accessibility to 911

The Commission raised the question of whether long-term NG911 applications based on Session Initiated Protocol (“SIP”) and Real Time Text (“RTT”) have the potential to provide “substantially improved accessibility to 911 services for people with disabilities.”¹³ Neustar does not believe that special purpose mechanisms for people with disabilities work well; instead Neustar believes that general purpose facilities work better. For example, AOL’s Instant Messaging application was extended to support RTT but its use is very rare, even among deaf and hard of hearing users. It is not that line-at-a-time IM is better than RTT; rather it’s that everyone uses line-at-a-time. People with disabilities will get more out of using what everyone else uses than they will from a mechanism created just for them.

The Internet Engineering Task Force (“IETF”) emergency calling standards¹⁴ and the NENA NG911 Standards,¹⁵ attempt to accommodate many communities that need assistance when placing emergency calls using general purpose mechanisms useful to a wide variety of callers. The Commissions should not adopt special purpose mechanisms that are only useful to small groups of persons; instead it should encourage the use of mechanisms of general purpose for those groups as well. The same mechanisms that are used to support telematics providers who assist callers, such as On-Star, can also be utilized to support various forms of relay services used to support persons who are disabled. All forms of calls where there is an assistant as a 3rd party are treated alike by NG911.

¹³ Notice at ¶70.

¹⁴ The IETF Emergency Context Resolution for Internet Technologies standards can be found at: <http://datatracker.ietf.org/wg/ecrit/>.

¹⁵ All NENA standards can be found at: <http://www.nena.org/?TechnicalStandards>. The principal NG911 standard, 08-003 can be found at: http://www.nena.org/general/custom.asp?page=i3_Stage3.

Unfortunately, because public safety budgets are chronically tight, there is concern that NG911 will be deployed with insufficient resources, such as the bandwidth and call taker equipment to support multimedia, especially video. It is essential that all multimedia – audio, video and text – be required of all NG911 implementations from the beginning, specifically including full support for three-way video at all PSAP positions.

There is also concern that it will be difficult to support the wide variety of assisted devices and services for people with many different kinds of disabilities and impairments.

Although the current 911 system may have a larger problem supporting deaf and hard of hearing persons, it also has difficulty supporting people with speech impediments, motor coordination issues, etc. Any device that is used to assist, and any service used to provide assistance, should be capable of supporting emergency calls of some form, at least when those devices and services provide communications capability to their users. Careful consideration needs to be given to how to support many different kinds of devices and services without requiring PSAPs make specific arrangements for each new kind of assistance.

2. Consumer Expectations

Neustar believes “promoting or requiring delivery of text and multimedia communications accurately reflects current and evolving consumer expectations and the needs of PSAPs and first responders.”¹⁶ Consumers, especially younger, technology aggressive consumers, expect their devices and services to work as well for emergency communications as they do for communications to their friends. Education that something doesn't work is very difficult. It took the nation many years of training starting at a very young age to train people to

¹⁶ Notice at ¶72.

use 911 in emergencies.¹⁷ Training them to call when they would ordinarily would text, especially when they are stressed, is unrealistic. .

To accommodate consumer expectations like this, it must be possible for communications to 911 to succeed from any reasonable communications device or service that ordinarily is used to communicate among people who aren't co-located. If a service or device offers any notion of what could be called a "conversation," it ought to be able to be used for emergencies. To make that work requires it to be simple, well documented, and very, very low cost to send "calls" to NG911. It also requires liability concerns be addressed. It requires outreach, and it may require some level of regulation to get it to be universal.

3. Improved information for PSAPs

The Commission notes that PSAPs and first responders will benefit from the new and varied information that will be available to them from the multimedia applications supported by NG911 technologies. The Commission asks if there are “any steps that [it] should take now to encourage further development of those technologies?”¹⁸ A good first step would be to promote the NENA/IETF NG911 standards for getting multimedia and data into the system. These standards cover reasonable ways to provide a very wide variety of media and data, at low cost and complexity, into the system. However, every new kind of dataset means the 911 system has to have ways to present and interpret that data. This means all of the vendors have to come to agreement with each other on common standards for a particular type of data, and provide PSAPs with guidance, and possibly training, on how to present and interpret it. For example, the system can only tolerate one kind of passenger vehicle telematics data set; it cannot have

¹⁷ A non-scientific, non-statistically valid informal survey of middle school students had two questions: should text-to-911 work and does text-to-911 work. The response with ~20 respondents was 100% that it should work and a distressing 22% that it does work now.

¹⁸ Notice at ¶73.

different vendors supplying different kinds of data, in different forms to 911. The Commission could work, possibly with other agencies such as Department of Transportation, to promote standards setting for these datasets.

The Commission also asks how the PSAPs will be able to cope with the increased amount of data that will begin flowing into them.¹⁹ Neustar shares these concerns, but believes there are reasonable ways for PSAPs to handle the data. In many cases, it is the responders that can use the data, and the PSAP's task is not to present or interpret the data, but simply to pass it on to the RIGHT responder. It has to go through the 911 system, because only the PSAP knows which responders are assigned to the incident. However, there will often be cases where it will be helpful for PSAPs to be able to interpret the data in some way. Their systems will need to be flexible to be able to handle new datasets and new algorithms that process the data in the datasets without expensive upgrades. They will need to be able to have frequent training, cost effective training, to be able to make use of the data. The systems need the ability to automatically evaluate and act on data. An example is that the vehicle telematics industry has worked with CDC to develop a severity of injury predictor based on sensor data in telematics equipped vehicles. The call routing mechanisms could be equipped to recognize the data set was available, run the algorithm, and provide an early warning to a helicopter rescue service that they may be needed. The EMS service would most likely make a decision of whether to actually request the helicopter, but if the warning provided the ability to shave response time, it would be valuable.

There are some technical limitations of current devices that inhibit the ability to achieve some of the PSAP and first responder benefits that the Commission raises. A simple example is that mobile phones cannot take a picture while a call is in progress. It is not currently possible

¹⁹ *Id.* at ¶74.

for a caller to get a picture into the PSAP because the caller has to hang up, take the picture, send it, and then get back into a conversation with the same call taker. The Commission could encourage carriers and equipment manufacturers to remove these kinds of limitations on their devices and services in the future.

4. Improved Reliability and Resiliency

Neustar believes that NG911 will provide substantially better service in disasters than the present E911 system does if it is deployed intelligently and if PSAPs are trained appropriately. As envisioned by the IETF and NENA standards, there are several advantages to handling text for NG911:

- a) Calls and messages can be easily diverted to other PSAPs, with all the necessary data and mechanisms for those PSAPs to effectively answer them;
- b) There are far fewer capacity issues in the 911 system itself because the "trunk" mechanism that controls congestion in the system has been completely eliminated; and
- c) Newer systems can do what commercial call systems can do – route calls based on location to specific call takers, and allow call takers to handle more than one text conversation at the same time.

These advantages can be realized without any origination network changes, although evolution of networks to IMS or other IP-based technologies should enhance their ability to provide connectivity to more people to the 911 systems in time of disaster.

Disaster routing in NG911 is designed to be dynamic – changes in the routing polygons in the route databases can be made at any time, and calls will start using them in minutes. This will be very useful when disasters disrupt connectivity. Although IP networks are better than other kinds of networks in these circumstances, because they will discover a path, if any path exists, to establish connectivity between two points in a network, there will still be connectivity

issues. Dynamically changing route polygons to deal with connectivity issues would be very helpful. Unfortunately, many current E911 practitioners don't understand these issues, or the possible solutions, and are tending to fall back on current inflexible routing mechanisms. The Commission could be helpful in educating E911 practitioners, crafting rules, and working with other federal agencies to bring more training and expertise to the table.

One of the potential benefits of text-to-911 is that it may relieve network congestion in a major emergency situation, particularly since text messages require less bandwidth than voice calls. Neustar notes that the IETF and NENA standards include mechanisms to mark 911 traffic so those messages can be given priority.

B. Standards Development for NG911 Applications

In Section III(C)(2) of the Notice, the Commission asks about the “ongoing activities of standards-setting bodies regarding the deployment of IP-based text and multimedia emergency services for next generation networks.”²⁰ Standards drive implementations and interoperability critical to making the 911 system work. Neustar is a participant in a wide variety of standards organizations and, specifically, its staff includes major contributors to standards for emergency calling.

Neustar believes that the NENA NG911 standards, together with the Internet Engineering Task Force (“IETF”) emergency call standards upon which the NENA standards are based, have had extensive reviews, and not only are they complete and interoperable, but implementations based on them have already begun.²¹ A second version of NENA's core i3 standard, NENA 08-

²⁰ *Id.* at ¶76.

²¹ *See, e.g.*, State of Maine Public Utilities Commission Request for Proposal, Next Gen 9-1-1 Services, RFP# 201106108, Section 2.5.4.2. (Providers shall have eighteen months to comply with NENA standards after formal availability . . . In addition, the proposed NG9-1-1 services shall be based on open standards, specifically: . . . As described in the NENA “i3” document number 08-003) and Alabama Next Generation Emergency Network, REQUEST FOR PROPOSAL, RFP # AWB911.RFP.08042010, Section 5.4 (PROPOSERS must certify that their solution meets or exceeds the NENA i3 / NG9-1-1 standards).

003, is in preparation and should be ready for approval steps in mid-2012. As noted above, deployment based on the original version has begun, and NENA-sponsored interoperability testing has shown that with a few clarifications, interoperability based on Version 1 of NENA 08-003 is good. The IETF is also completing some additional standards work that is important, but not essential, for NG911 deployment. Most of this work will also be complete in 2012. There is no need to delay NG911 implementation for further NENA or IETF work.

Neustar is very aware that the Alliance for Telecommunications Industry Solutions (“ATIS”) and/or 3rd Generation Partnership Project (“3GPP”) are developing standards covering emergency calls in IP Multimedia Subsystem (“IMS”) networks, which are the future for a large number of services. Neustar believes that these efforts are extremely important, but they do not currently define a complete solution for NG911. The evolution of any standard is inevitable, and Neustar believes that both the IETF and NENA are willing to discuss changes to their standards to better align them with the ATIS/3GPP work as those standards develop.

The Commission notes that the 3GPP architecture is compatible with NENA’s i2 interfaces,²² but those interfaces give no capability for any of the desirable features of NG911. They are E911 interfaces that generate calls to TDM selective router interface using pANIs. They have no role in NG911 except as part of a transition of an existing VoIP origination network to i3. The NENA i3 interfaces are the only available, fully capable NG911 interfaces.

Neustar believes that, although ATIS and/or 3GPP standards for presenting calls to Emergency Services IP Networks (“ESInets”) using IETF/NENA interfaces is desirable, the lack of completed standards by these groups can be managed by the system. IMS uses an entity called an Emergency Call Session Control Function (“E-CSCF”) to connect an IMS network to

²² Notice at ¶77.

an emergency services network (although there is a security border control element between the actual networks, and if an IMS packet switched origination is terminating in a circuit switched emergency services network such as an existing E911 network, a gateway is needed as well). The 3GPP has specified all the interfaces needed to entities within the IMS network to support IMS originated calls to the E-CSCF. Vendors can use the existing IMS interfaces and the existing IETF/NENA interfaces to create a compliant, interoperable E-CSCF. Further, as noted above, both IETF and NENA are willing to work with the 3GPP so that their standards can come into alignment.

In addition, it is important that global standards be developed. Today, each nation has its own emergency calling network design and standards. These systems were designed when there were significant differences in calling networks among nations, and indeed call signaling standards for the Public Switched Telephone Network have several national variants. IP based signaling is different. There are no national variations in signaling. Future emergency calling systems such as NG911 should not have national variations, or at least such variations should be confined to within the ESInets and small. Among the benefits are compatibility with service providers who are not U.S. based, but serve visitors or residents in the U.S., and a robust global market for compatible equipment and services for PSAPs and 911 Authorities.

Fortunately, this seems to be happening. NENA standards are based on IETF standards, which are global. Origination networks and access networks can build to IETF standards and be compatible with NENA standards. Recent development in the European Emergency Number Association (“EENA”) will result in EU standards that are harmonized with NENA standards. Neustar believes the FCC should encourage the development of international standards for emergency calls, and refrain from mandating US-only standards.

C. Approaches Based on IP-based Messaging or Real-Time Text

The IETF and NENA standards cover multiple forms of text, audio and video. Instant Messaging – both session based and single line "pager" mode have been covered, as well as RTT. Video and audio are also covered. There have been proposed interworking between SMS and SIP-based IM that have not yet been standardized, but it is clear from that work that it could readily be done. The NENA/IETF NG911 standards are ready to accept all forms of multimedia into NG911 systems.

Today, instant messaging is widely deployed in many different kinds of devices and services. In the development of IETF standards for Instant Messaging, interwork between many different IM standards was examined, and it was deemed very feasible to interwork among them with relatively straightforward gateways. While NENA has indicated some interest in supporting Extensible Messaging and Presence Protocol ("XMPP") into the ESInet, because XMPP is not yet able to supply the marking, routing and location conveyance necessary to support emergency IM, it has not yet done so. The current IETF/NENA standards are entirely adequate to support all forms of instant messaging now, with suitable gateways and some enhancements to clients (to support location conveyance). While this would not require any carrier participation in the messaging, it would require access network support of IETF/NENA standards for location in an "over the top" environment.

RTT is a mature IETF standard. There are no known standards issues in fully supporting RTT over SIP. The NENA standards fully support the IETF RTT mechanisms. These are believed to be complete, sufficient, and currently implementable. There are no RTT solutions with the exception of things like the AOL support of RTT available other than TTY today, so

backwards compatibility is not much of an issue. AOL could very reasonably interwork AIM RTT to SIP RTT with the same sort of gateway and client upgrades needed to support IM. This too would require access network providing location to the OTT app. Implementing the gateways may require six to twelve months to design, construct and deploy, although they could be done in much less time if a need existed.

D. Approaches Based on Software Applications

Neustar is generally not in favor of application-based emergency call support in the short term. Neustar believes that its proposal to support SMS to E911 is readily extensible to handle proprietary IM systems such as AOL AIM, MSN or Yahoo IM on mobile platforms. Support of such systems in E911 on fixed platforms would necessitate self reported location, which would be at least as problematic for them as it is now for VoIP. As discussed above with regard to interim solutions, applications used only for emergency calls are unlikely to be satisfactory for users.

Long term, although Neustar does not support special 911 applications, it does wish to support any kind of service that provides audio, video or text based communications in the NG911 environment. The existing IETF/NENA standards make that feasible, at low cost to service providers and device manufacturers. There is a need for these types of service and other “Over-The-Top” (“OTT”) services to be location aware in order to be useful for NG911. Unfortunately, these services do not have independent ability to obtain location. A possible solution to this problem would be for these services to obtain location information from the underlying network service provider through the end user’s device. Typically this does not happen today. Neustar recommends that network providers and equipment manufacturers strongly consider designing into next-generation networks and equipment the capability to share

necessary location information with OTT services or origination networks on devices connected to the access network.²³ If the access network provides location, and the route database is available free on the Internet, then support of IETF/NENA style emergency calling is a matter of interworking the service to SIP and supporting the IETF "phonebc" standard.²⁴

E. Facilitating the Deployment of NG911

1. Deployment of NG911 Networks

a. ESInets

All involved in NG911 agree that PSAPs will be connected to an ESInet of some fashion. The design, deployment and management of that network are critical to the success of NG911. Neustar firmly believes that the nation requires a SINGLE ESInet for all of public safety. The United States cannot afford one network for 911, another for police, another for fire. It cannot afford one wireless network and a different wired network. It cannot afford a network in Dubuque that cannot contact public safety agencies in New York City when needed and when permissions allow such access. The United States needs a single, nationwide network.

The "National Public Safety Broadband Network", which most believe is just a wireless network based on the D-Block, should not be planned and implemented independently of the ESInet. It is but a component of the ESInet, and should be fully integrated into it. NG911 does not need its own network; it is just an application running on a shared network.

Such an ESInet cannot be a centrally planned, nationally organized, everything to everyone network. It needs to be primarily local, or ideally state based, with interconnects

²³ The network that supplies the basic communications service is called the "access network" and the network that provides the real time media service (telephony, video, messaging) is called the "origination network". While they can, and often will, be the same entity, they are not always, and regulations must take this difference into account. The access network knows where the caller is (or can reasonably find out), but the origination network, if different from the access network, does not know and cannot reasonably find out.

²⁴The IETF "phonebc" standard can be found at: <http://tools.ietf.org/html/draft-ietf-ecrit-phonebc>.

between local networks to form a state network, and interconnects between state networks to form a national network. Both wired and wireless links should be included in the ESInet. The United States cannot realistically build a wireless network and then graft on, or interwork it to a wired network.

Similarly, the United States absolutely must get beyond the tyranny of the rivalries in communications networks that typically inhibit sharing of infrastructure between public safety agencies. The United States simply cannot afford to pay for, manage, or count on separate agency networks. Individual agencies cannot be permitted to build their own network at tax payer or rate payer expense. The United States absolutely must build one network.

Fortunately, IP makes this simple from a technological standpoint. Unfortunately, there is a great deal of political, regulatory, and financial inhibitors to achieving this in reality. Neustar urges all parties to recognize the inherent advantages of building one network, and to commit to achieving this important goal.

b. State Planning and Deployment of ESInets

Neustar believes that states are in the best position to plan and deploy ESInets, and the NG911 infrastructure that rides on such networks. It unrealistic to do a single national plan; local direction is needed for the reality of connecting EVERY public safety agency onto the ESInet. Trying to deploy ESInets one PSAP or one 911 Authority at a time is not feasible. Six thousand PSAP plans, more than 3000 911 Authority plans, or even, in most cases, 2000 county plans are just too fragmented, too unwieldy to work well enough. It is also true that the expertise to design IP networks suitable for public safety is not typically available locally, and even contracting for expertise is very difficult if the contracting agency does not have sufficient background in IP networks to be able to specify, select and manage a contractor.

Neustar believes every state should be required to develop and implement a plan to deploy statewide ESInets. A federal agency, perhaps the FCC, should monitor these plans and report to Congress and the country on their implementation. Every public safety agency, broadly defined, should be connected to these networks, via wired, and in most cases, wireless connections. As described below, these statewide ESInets will be joined together to form a national ESInet.

c. National Infrastructure for ESInets

Although Neustar advocates statewide ESInets, and in many states, local or regional subnets, there is a need for some national infrastructure, both at the network level and the NG911 application layer. While simple interconnection of neighbor state ESInets will form a national ESInet (as is the nature of IP networks), a national backbone network will facilitate and optimize traffic, especially when very large-scale disasters occur. For this reason, there is a need for one federal agency or another to contract for a national backbone network. Neustar expects such a backbone to use existing fiber facilities of major carriers.

Specifically for NG911, there are three services that must be provided at the national level. First, to facilitate routing of calls that are misdirected, have wildly inaccurate location, or occur when service providers are not U.S. based, but are completing calls for subscribers who are in the U.S., there is a need for a function called a “National Forest Guide”. This function, defined by IETF and NENA standards interconnects statewide routing facilities so that interstate calls and transfers can occur. Second, to implement the security mechanisms described in NENA standards, an entity must issue credentials to public safety agencies and their employees, and these credentials must be cryptographically protected. To achieve this, an entity called a “PSAP Certificate Authority” must be created at the national level. Third, since the ESInet must

be interconnected with the public Internet, NG911 will be subject to cyberattack, as every Internet connected entity must expect. To assist local, state and national ESInet managers in protecting and defending against such attacks, there is a need for a national NG911 Computer Emergency Response Team (NG911-CERT).

d. Coping with Disaster

One of the drivers for the deployment of NG911 is increasing the ability of the 911 system to provide better service in disaster scenarios. The standards promulgated by NENA contain extensive mechanisms designed to keep the system stable and operating when a great deal of the infrastructure is disabled. However, these mechanisms can only help if they are deployed and managed correctly. To achieve better service in disasters, ESInets must:

i. Be extensively redundant

PSAPs should use EVERY available independent IP connection available to them, not just the current favored layer 2 technology the local carrier provides. IP networks have the very desirable characteristic that if there is a path between two places, the network will discover it. Having more paths that might work when needed increases the chances that connectivity can be maintained. This argues against relying on one traditional network provider to design and manage the ESInet. They will inherently favor their own facilities, rather than using every possible facility available to a PSAP. Similarly, the NG911 applications must be extensively replicated. A typical design for a network that has the volume of a 911 system would often have two geographically isolated copies of a given function. That is woefully inadequate to support disaster scenarios, which typically isolate areas from each other. Instead, many smaller copies of the function should be distributed all over the state.

ii. Allow calls to be answered out of area

Today, 911 systems are fairly well isolated from one another, and except in a few instances where mutual aid arrangements have been made, and agencies purchase equipment from the same vendor, it's not feasible for one PSAP to take another PSAP's calls. Not only is the routing infrastructure inflexible, the mechanisms available to allow a distant PSAP to enter a call into the dispatch system of the appropriate responder agencies are non-existent. Standards (CAD to CAD) for this purpose are nascent, but advancing rapidly. The industry must finish these standards and deploy them extensively in order to realize many of the benefits of NG911. Of significant concern is the parochial nature of public safety officials, who would often prefer that a caller get a busy indication rather than have a distant PSAP handle their calls when they are busy. Of course, unless the distant PSAP can be effective if it answers the calls, it is not a good idea to divert them, but if that problem is solved, then local officials must be convinced to agree to use them, and train their people to make it work. Federal officials have a role in building the impetus and the relationships that would make this more feasible.

2. Transition to NG911

Neustar recommends the transition plan that the NENA standards describe.²⁵ This plan allows gradual migration of PSAPs and access/origination networks from the existing E911 system to NG911 while maintaining service at all times. A critical aspect of transition is how to get it completed within a reasonable time. For both the origination networks and the PSAPs, both old and new systems have to be supported simultaneously through the transition period. For example, a 911 Authority has to pay for both the old Selective Router and ALI and the new ECRF and Emergency Service Routing Proxy ("ESRP") simultaneously throughout the

²⁵ The NENA NG911 transition plan can be found at:
http://www.nena.org/general/custom.asp?page=NG911_TransitionPlng.

migration period. That will cost at least twice the current cost, and perhaps more (since the transition element, the LSRG must be provided also). This overlap in some form or other is unavoidable, but it must be short; shorter than many imagine. Twelve to eighteen months may be as long as it is tolerable to pay for both the old and new networks. During this time, all PSAPs and all origination networks must migrate to the ESInet, and access networks not currently providing location will hopefully implement the mechanisms to provide it.

Origination networks, especially those with national footprints, have a similar problem. They have to maintain the existing mechanisms and implement the new mechanisms, and until all the PSAPs in their service territory have transitioned, they need to maintain them both.

This means transition cannot take a decade. Ways must be devised to make this migration take months in a given area, and a few years nationwide. This is a significant challenge. As a practical matter, transition starts when the first PSAP in an area upgrades. Transition is complete when all PSAPs and all origination networks have migrated. Neustar believes that planning for transition must be state level, and PSAPs, origination networks and access networks may start their transition when the ESInet, NG911 core components and migration elements are in place and must be finished by some relatively short time (twelve to twenty-four months) of the initial transition, with a potentially shorter time within a given region.

IV. CONCLUSION

Neustar looks forward to continuing to work with the Commission, the telecommunications industry and the public safety community on issues involving interim text-to-911 solutions and on the evolution of NG911.

Respectfully submitted,

A handwritten signature in dark ink, reading "Richard L. Fruchterman, III". The signature is fluid and cursive, with a large, stylized "R" at the beginning and a circular flourish at the end.

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